

	<u>No of Inhabitants</u>	<u>Total Area (ha)</u>	<u>Total Forest Area (ha)</u>	<u>Forested Area (Ha) (Percent)</u>	<u>Percent of Total Area Which is Forest Area</u>
Yugoslavia	15,751,935	25,658,900	8,744,725	7,344,942 84	28.6
Serbia	6,523,224	8,856,300	2,072,366	1,692,414 82	19.1
Croatia	3,749,039	5,593,700	2,420,822	1,893,587 78	33.7
Slovenia	1,389,084	2,019,200	857,724	832,920 97	41.2
Bosnia- Hercegovina	2,561,961	5,156,400	2,219,808	1,927,115 87	37.4
Macedonia	1,152,054	2,649,400	655,665	550,722 84	20.7
Montenegro	376,573	1,383,900	518,340	448,184 86	32.5

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Total forest area includes all areas covered by forests, as well as areas surrounded by forests which are not forested but serve the forest economy.

The forested areas include all areas covered by trees regardless of tree size, as well as small bare areas, roads, and any clear land in the forests which could be gradually forested.

With an average of 0.47 hectare of forest per capita, Yugoslavia has a potential wealth of forest products, since every country with over 0.35 hectare of woods per capita is considered to be a wood export nation.

Ownership of Forests

State and private ownership of forests in Yugoslavia is divided as follows. Forests designated as private include all private, cooperative, and any other forests that are not state forests.

	<u>State Forests</u>		<u>Private Forests</u>	
	<u>(Ha)</u>	<u>(Percent)</u>	<u>(Ha)</u>	<u>(Percent)</u>
Yugoslavia	5,219,366	71	2,125,576	29
Serbia	979,449	58	712,965	42
Croatia	1,551,359	82	342,228	18
Slovenia	229,976	28	602,944	72
Bosnia-Herzegovina	1,658,908	86	268,207	14
Macedonia	473,620	86	77,102	14
Montenegro	326,054	73	122,130	27

The private forests in Slovenia are large forest areas fit for industrial exploitation; the private forests in Serbia are small woods which provide owners with lumber.

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	Forest Types							
	High Forests for Clean Cutting and Planting		High Forests for Selective Cutting		Low Forests		Brushwood	
	(Ha)	(Percent)	(Ha)	(Percent)	(Ha)	(Percent)	(Ha)	(Percent)
Yugoslavia	1,315,849	16	3,385,654	46	1,165,069	16	1,478,370	20
Serbia	228,494	13	467,552	28	561,714	33	434,654	26
Croatia	850,524	45	337,620	18	332,968	17	372,475	20
Slovenia	--	--	800,045	96	28,797	4	4,078	--
Bosnia-Herzegovina	--	--	1,219,820	63	241,590	13	465,705	24
Macedonia	104,148	19	331,098	60	--	--	115,476	21
Montenegro	132,683	30	229,519	51	--	--	82,982	19

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High forests for clean cutting, planting, and selective cutting are forests planted from seed over 40 years ago. Low forests are forests which originated mostly from shoots and are less than 40 years old. Brushwood forest is neglected and degenerated forest land covered with brush and stunted trees which serve mostly as pastures and food for livestock. Any other forests, such as forest parks, which cannot be included in other categories are included in this category.

High forests of deciduous trees and conifers are distributed as follows:

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	Coniferous Trees				Deciduous Trees				
	Total (Ha)	(Percent)	Fir and Juniper Trees (ha)	Pine and Other Conifers (ha)	Total (Ha)	(Percent)	Oak (ha)	Beech (ha)	Other Decid- uous Trees (ha)
Yugoslavia	1,461,364	20	1,242,279	219,085	5,883,578	80	1,376,964	3,919,219	587,395
Serbia	116,440	7	86,470	29,970	1,575,974	93	365,070	1,000,634	210,270
Croatia	232,862	12	202,062	30,800	1,660,725	88	400,493	1,108,557	151,675
Slovenia	441,448	53	383,148	58,300	391,472	47	18,304	327,357	45,811
Bosnia- Herzegovina	529,958	28	470,217	59,741	1,397,157	72	275,844	1,069,552	51,761
Macedonia	23,680	4	7,160	16,520	527,042	96	230,753	194,405	101,884
Montenegro	116,976	26	93,222	23,754	331,208	74	86,500	218,714	25,994

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Age of Trees in High Forests

	1-40 Years		41-60 Years		Over 60 Years	
	(Ha)	(percent)	(Ha)	(percent)	(Ha)	(percent)
Yugoslavia	717,104	54	428,719	33	170,026	13
Serbia	117,568	51	70,324	31	40,102	18
Croatia	404,325	48	325,035	38	121,164	14
Slovenia	--	--	--	--	--	--
Bosnia-Herzegovina	--	--	--	--	--	--
Macedonia	85,318	80	14,570	14	6,260	6
Montenegro	111,893	84	18,290	14	2,500	2

In normal balanced forestation, each age category should comprise about 33.3 percent of the forested area. The above shows that the oldest category is considerably deficient, being only 13 percent, while the middle category is normal, and the youngest category is over large with 54 percent.

Categories According to Thickness of Tree Trunk

The thickness of tree trunks in high forests for selective cutting is as follows:

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	High Forests for Selective Cutting (cu m)	1-20 Cm Thick (Cu M) (Percent)	21-40 Cm Thick (Cu M) (Percent)	Over 40 Cm Thick (Cu M) (Percent)
Yugoslavia	616,265,279	118,326,772 19	239,918,677 40	258,019,380 41
Serbia	75,029,607	18,011,512 24	22,955,467 31	34,062,628 45
Croatia	74,878,076	7,558,575 10	24,118,380 32	43,201,121 58
Slovenia	109,942,351	38,070,458 35	55,729,474 51	16,142,419 14
Bosnia-Herzegovina	260,055,610	36,526,227 14	98,895,356 38	124,634,027 48
Macedonia	42,230,018	11,880,000 28	15,200,000 36	15,150,018 36
Montenegro	54,129,617	6,280,000 12	23,020,000 42	24,829,617 45

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The above table shows that the categories of trunk thickness in Yugoslavia as a whole are unsatisfactory, because the proportions should be 20: 30: 50, instead of 19: 40: 41:

Forest Production Capacity

The production capacity of the total forested area is as follows:

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	<u>Total Forested Area (ha)</u>	<u>Avg Amt of Timber per Ha (cu m)</u>	<u>Total Standing Timber (cu m)</u>	<u>Avg Accretion per Ha (cu m)</u>	<u>Total Ann Accretion (cu m)</u>
Yugoslavia	7,344,942	109	798,125,269	1.93	14,164,923
Serbia	1,692,414	69	116,885,444	1.68	2,850,000
Croatia	1,893,587	98	186,430,096	1.97	3,730,000
Slovenia	832,920	133	110,842,494	3.07	2,715,000
Bosnia-Herzegovina	1,927,115	139	266,880,600	1.88	3,622,976
Montenegro	448,184	147	65,779,617	1.37	613,617
Macedonia	550,722	93	51,307,018	1.15	623,330

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Slovenia has the largest forest accretion because its forests are mostly young conifers. The accretion in Bosnia-Herzegovina is relatively low because there are large areas of old forest unsuitable for cutting and large areas of brushwood.

FORESTRY IN YUGOSLAVIA BEFORE THE LIBERATION

Up to the beginning of 1900, the forest yield in Yugoslavia was larger than the demands made upon it. During the past 40 years, the forest areas have suffered to the largest extent in Bosnia-Herzegovina because of seizure and denudation of state forests. About 600,000 hectares, or about 25 percent of the entire forest area, were cleared during that time. Private forest areas in Serbia decreased considerably also. Although no detailed information is available on the decrease, it is estimated that it was about 15 percent of the total forest area. The forest area in Slovenia increased somewhat. The changes in the forest areas in the other republics were not significant. Postwar Yugoslavia therefore inherited forests which will require earnest and prolonged work to improve.

The poor condition of the forests is evident in the large areas of brushwood or otherwise degenerated forest, the large percentage of low forests, and the low proportion of high forests. This poor condition was caused primarily by the colonial method of industrial exploitation and by extensive logging.

Forests were reduced rapidly by reducing the timber reserve and by exploiting the best types of timber, such as oaks and conifers.

The period of heavy exploitation of accumulated reserves in the high forests lasted from 1900 to 1930. Forest exploitation was at its height in 1929, but began to decrease sharply in 1931, 1932, and 1933. Logging never again reached its previous volume, although it gradually increased and reached a low peak in 1939 and 1940 when the demand for lumber increased because of war preparations. The bad market situation after the world crisis in 1930, coupled with forest depletion, caused the cancellation of a large number of long-term contracts [for lumber]. The remaining long-term contracts for the most part would have expired in 1945 when the accumulated reserves would have been used up. Unexploited reserves were located only in forests far from public transportation and in less important, mostly pure, beech forests.

Forest Exploitation by Farmers

In prewar Yugoslavia, 66 percent of the timber cut was cut by farmers; in earlier times, this percentage was even higher. This timber was intended primarily for the farmers' own needs but was also used for small-scale trade. The small-scale trade supplied cities with firewood, artisans with industrial lumber, and retail merchants with various commercial items, primarily firewood, railroad ties, mine timber, and carpentry items. Sometimes merchants engaged in small-scale trade organized logging enterprises but their participation was limited to financial support and management; the production facilities belonged to the farmers.

The farmers' exploitation of forests is characterized by waste and denudation. This applies especially to areas where industrial exploitation did not exist, or where industrial exploitation was in the hands of large enterprises. In those areas where the timber cut by farmers was processed for trade, as in Slovenia and Gorski Kotar in Croatia, the farmers' exploitation was not as wasteful. The utilization of timber was also efficient in areas where forests are scarce, as in the Vojvodina, the coastal areas, and some parts of Macedonia.

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The excessive exploitation of forests as pastures, especially where young forests were used as pastures, caused tremendous damage. Since forest destruction progresses more rapidly in areas unfavorable to forest cultivation because of shallow soil and steepness of contour, most of the denuded areas are in Hercegovina, on the coast, and in Macedonia, all of which suffer from drought.

Further forest depletion was caused when forests were cleared to enlarge the agricultural area and to obtain more pastures. Trees were not felled or utilized, but bark was peeled from the trees in the form of a ring so that the tree would die. Clearing was very often done on land which was too steep and had soil too shallow for continuous agricultural exploitation, thus turning it into sterile barren tracts.

The rapid increase in population in Yugoslavia made the problem of land that could not be cultivated even more critical by creating overpopulation in agricultural areas. Poorly developed industry, mostly of a semicolonial type with a relatively small number of workers, was not able to absorb the surplus manpower. The farmer was forced to satisfy his needs by forest cutting and forest pasturing on the one hand, and by enlarging his agricultural area at the expense of the forest, on the other.

Industrial Exploitation of Forests

Industrial exploitation of forests was formerly in the hands of large firms and state enterprises. Thirty-four percent of the total timber cut was cut for industrial exploitation.

About three fourths of the timber was cut by private firms and one fourth by state enterprises. Lesser domestic capitalists exploited some forests industrially, but were often financed by foreign capital. Foreign capital's participation in the lumber industry cannot be accurately established, but is estimated at 50 percent.

Large capital interests entered into industrial forest exploitation more intensively from 1820 to 1900. The situation was very favorable for the development of the lumber industry because it had at its disposal large areas of virgin forest. The large areas of old oak forests in Slavonija and Srem produced the finest oak lumber in Europe. Plentiful and cheap manpower was also available. The favorable geographic location of Yugoslavia's seaports and the fact that its frontiers border on import countries made it easy to put lumber products on the market.

Industrial exploitation was very primitive in the beginning. For instance, beechwood from Velebit was utilized by burning it on the spot to obtain potash. Expensive Slavonian oak was used exclusively for barrel staves.

Industrial forest exploitation was directed mostly toward production of raw materials for processing in sawmills. Other industrial processing, as for cellulose, tannin, mine timbers, railroad ties, poles, or piles, was considered secondary. In forests where transportation was poor, only logs and perhaps railroad ties were hauled out while other timber was left to rot. Forests were depleted quickly because a great deal of large-scale exploitation was based on supplying sawmills.

Large investments were necessary to open forests for exploitation, construct roads in forests, and build sawmills. A large and widespread network of roads was needed, especially in Bosnia and Croatia, because the public road system was inadequate. Consequently, forests were often leased to large enterprises under long-term contracts. There were cases when the state built the roads and communications (as, for instance, 120 kilometers of forest railroad in the Krivaja area), but forest exploitation was leased to a private firm under a long-term contract.

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Production and Consumption of Timber

The production capacity of forests has declined steadily because of depletion. It is not possible to determine exactly the production capacity of forests since only a negligible part of the forests has been inventoried.

The book, Statistika suma: sumske privrede za 1938 godinu (Forest and Forest Economy Statistics for 1938), published by the Ministry of Forests and Mines, was based on an inventory of 1,782,972 hectares, or 26 percent of the total forest area. According to this inventory, the average annual accretion was 15,963,275 cubic meters or an average of 2.20 cubic meters per hectare.

Actual cutting was reported to have totaled 22,688,090 cubic meters in 1938, but estimates based on official data on cutting in state forests and railroad statistics on lumber transportation show that the annual volume of logging in prewar Yugoslavia was between 25 and 30 million cubic meters or an average of 1.5 million cubic meters or almost twice as much as the annual accretion. Farmers cut 66 percent, or 18 million cubic meters; industrial cutting involved 34 percent, or 9.5 million cubic meters; and an average of 4.3 million cubic meters was cut for export.

Official statistics show that timber consumption in prewar Yugoslavia was 1.08 cubic meters per capita, 0.36 cubic meter for industrial use and 0.72 cubic meter for firewood. Taking waste into account, the consumption was 1.35 cubic meters per capita. However, consumption was actually higher, for official statistics were excessively low. It is estimated that actual consumption per capita was 1.23 cubic meters net or 1.55 cubic meters gross.

Exploitation of Forests

Most foreign capitalists were not interested in making the forests a steady supply base, but rather in investing as little as possible and taking out as much as possible. After exhausting an area, they would seek a larger or a new area. If they were not able to find it, they would move on to a different country.

Since manpower was cheap, forest exploitation was very poorly mechanized. In felling and preparing logs for transport, no mechanization existed. In hauling timber to the transportation point, only a few attempts were made to use tractors. Forest railroads were used to transport lumber, but truck transportation was negligible. Consequently, transportation was mechanized only about 30 percent, most transport being accomplished with horses and oxen.

Lumber Processing

The best developed units in the lumber industry were the sawmills, but in some areas there were too many of them. Yugoslavia had 3,296 sawmills, most of which (2,248) were primitive water-propelled mills. Their capacity was 7 million cubic meters, but they processed only 4.5 million meters, utilizing an average of 60 percent of their capacity.

Yugoslavia had 13 veneer factories. Most of these were small plants connected with the sawmills. It had only two plywood factories; these could process 25,000 cubic meters of undressed lumber. Two furniture factories produced plywood and paneling for their own use.

The finished wood products industry was poorly developed, having plants only in Slovenia, Croatia, and the Vojvodina. They produced furniture, cabinet work, parquet, cases, casks, frames, ~~logs~~, excelsior, office and school equipment, brushes, and the like. In wood chemicals, the tanning extracts industry, which produced mostly for export, produced 5,500 tons of extract from 1931 to 1938.

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The cellulose factories had a total capacity of 30,000 tons, but there was enough new material available to produce three times that amount.

The turpentine and rosin industry was very poorly developed, producing an annual total of only 40 tons of turpentine and about 200 tons of rosin, which was far from satisfying domestic needs. Raw materials available were utilized only to a negligible extent.

It is estimated that 3.5 billion dinars were invested [from 1931 - 1938?]
in the lumber industry.

Export

Yugoslavia exported only 4.5 percent of the total wood products exported by Europe, but held a leading position in the sawed-lumber trade, surpassing both Poland and Rumania.

The export of wood products steadily decreased from its peak in 1928 until 1937, when it increased slightly. The decrease was due to lumber production becoming increasingly difficult and expensive because (1) the most convenient forest areas had been depleted, (2) lumber was poorly protected by tariffs, (3) USSR lumber appeared on the world market, and (4) Rumania, which had been hit by an economic crisis, threw large quantities of lumber on the Mediterranean market at very low prices.

From 1927 to 1939, 19.42 percent of Yugoslavia's exports were wood products.

The export of deciduous products (including tannin and products of dry distillation) comprised 54.7 percent and the export of conifer products 45.3 percent.

From 1927 to 1939, the average annual export of wood products as reported by the Ministry of Trade was as follows:

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	<u>Measurement Unit</u>	<u>Quantity</u>	<u>Percent of Total Wood Exported</u>	<u>Value in Millions of Dinars</u>	<u>Value in Percent</u>	<u>Avg Value per Unit 1927-1929 Dinars</u>
Firewood	1,000 cu m	531.9	18.9	54.1	4.9	102
Deciduous logs	1,000 cu m	80.0	5.1	54.5	4.9	881
Hand-hewn deciduous lumber	1,000 cu m	19.4	1.1	13.4	1.2	691
Sawed deciduous lumber	1,000 cu m	323.4	16.0	240.5	21.8	744
Railroad ties	1,000 pieces	982.5	7.7	69.5	6.3	71
Charcoal	1,000 tons	39.2	2.8	28.1	2.5	717
Tanning extracts	1,000 tons	14.3	1.0	54.4	4.9	3,804
Other deciduous products	1,000 tons	65.5	4.6	83.3	7.6	1,272
Total of deciduous products	1,000 tons	807.0	57.2	597.8	54.1	741
Conifer logs	1,000 cu m	30.0	1.5	9.4	0.9	313
Hand-hewn conifer lumber	1,000 cu m	214.9	9.1	78.3	7.1	365
Sawed conifer lumber	1,000 cu m	892.2	31.6	382.6	34.6	429
Other conifer products	1,000 tons	7.6	0.6	37.1	3.3	488
Total of conifer products	1,000 tons	604.0	42.8	507.4	45.9	840

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Percent of Wood Products Exported, 1927 - 1939

	<u>Quantity</u>	<u>Value</u>	<u>Exported to</u>	<u>Remarks</u>
Firewood	18.9	4.9	Italy, Hungary, Poland, Switzerland, and Austria	Exports decreased until 1936 and then increased when beech cellulose wood was exported.
Logs (for veneer and sawing, mine timbers, cellulose wood, and Conifers)	6.6	5.8	Oak and ash to Germany; beech to Italy, Hungary, Greece, and Egypt; conifers Hungary, Italy, and Germany	Three times more deciduous logs were exported than conifers. The export of deciduous logs (for veneer) increased rapidly after 1936. Cellulose wood export increased rapidly after 1937. In 1939, of a total of 76,988 tons of conifer logs exported, 49,797 tons were for cellulose.
Hand-hewn lumber	10.2	8.3	Italy, and a little to Greece and Hungary	Export was constantly decreasing
Sawn lumber (total)	47.6	56.4	Various European and other countries. About two-thirds of the export was to Italy prior to 1936; from 1937 it was mostly to Germany and Great Britain. Sawn-oak lumber was exported to Great Britain, France, Holland, and Germany.	There was no significant change in the relation between the export of deciduous and conifer lumber during the entire period, but beech export continued to increase at the expense of oak.
Deciduous	16.0	21.0		
Conifers	31.6	34.6		
Railroad ties	7.7	6.3	Oak railroad ties were exported to all Central European countries; beech ties to Hungary and Spain; pine ties to Great Britain, Egypt, and Germany.	Seventy percent of the railroad ties exported were oak ties.

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Charcoal	2.8	2.5	Italy, Hungary, Greece, Albania and Germany	
Tanning extract	1.0	4.9	To all European countries	This was the most stable export.
Various processed products and finished products	4.6	7.6	Veneer to England, parts for cases to Palestine; wicker furniture to England and the Mediterranean countries.	The export of large quantities of veneer started in 1937, reaching 3.6 percent of total wood exports. The export of wicker furniture is increasing.
Chemical products and other by-products	0.6	3.3	To various European countries.	The export of products of dry distillation were decreasing constantly; they decreased from 47 million dinars' worth in 1927 to 6-7 million in the last years. The export of by-products used in hunting were very variable, reaching in some years 1.5 percent of wood exports.

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Exports of Forest Products to Various Countries. 1927 - 1939 (in percent)

<u>Exports to</u>	<u>Quantity</u>	<u>Value</u>	<u>Products Mostly Exported</u>	<u>Remarks</u>
Italy	49.5	42.2	All types, but mostly of inferior grade.	
Mediterranean countries	14.0	13.8	Sawed lumber, railroad ties, charcoal, parts for cases, wicker furniture.	
Hungary	12.4	8.1	Firewood, charcoal, ties and sawed lumber.	
Germany and Austria	7.5	11.4	All types except firewood. Increase in sawed lumber and deciduous logs during the last years.	
Great Britain	4.9	7.7	Sawed oak and beech lumber, veneer, and sawed conifer lumber (in the last years).	
France	3.0	3.8	Sawed conifer and deciduous lumber.	Exports were constantly decreasing.
Other countries	8.7	13.0	Various products	Holland imported a large quantity of fine oak lumber and ties. Argentina imported mostly sawed conifer lumber.

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The timber that had to be cut for export averaged 5.6 million cubic meters. In 1928 and 1929, timber cut for export averaged 8 million cubic meters a year.

Most wood products were shipped by sea. From 1935 to 1939, 58.5 percent was shipped by sea, 5.3 percent by river, and 36.2 percent by railroad.

Individual ports participated as follows: Susak, 46.2 percent; Rijeka, 6.4 percent; Sibenik, 10.6 percent; Split, 1.4 percent; Metkovic, 7.0 percent; Dubrovnik, 23 percent; Solun, 3.6 percent; and other ports, 1.8 percent.

THE FOREST ECONOMY IN POSTWAR YUGOSLAVIA

War Devastations

During the war, occupation forces inflicted heavy damage by cutting down large sections of forests to insure communications; by extensive exploitation of accessible forests, devastating them and leaving them bare; and by destroying most of the lumber industry communications and installations.

Indirect damage was inflicted because the people, especially in the large cities where they were unable to get a regular supply of wood, cut down the most beautiful trees and even trees in parks in their immediate neighborhoods.

According to official data from the federal Ministry of Forestry, 295,000 hectares of seedlings and nurseries were destroyed, 175,000 hectares of forests were transformed into bare land, and 48,700,000 cubic meters of timber were cut.

The occupation troops used up timber reserves as follows: 2,200,000 cubic meters of firewood, cellulose, and tannin wood, 3,400,000 cubic meters of sawed and hand-hewn lumber, and 87,000 cubic meters of veneer, plywood, and parquet.

They destroyed or damaged the following (in percent):

	<u>Destroyed</u>	<u>Damaged</u>
Buildings of the Administration for Forest Protection and buildings of the Forest Management Service	28	55
Forest railroads	84	14
Forest roads	--	55
Sawmills	31 (1,150 mills)	36 (1,316 mills)
Cellulose factories	1	2
Impregnation installations	2	3
Turpentine factories	1	1
Plywood factories	1	1
Tannin factories	2	7

Forest Exploitation

Postwar Yugoslavia has nationalized forests, like other production resources, except for small rural forests. Forest exploitation is effected as follows: Farmers, who supply themselves from their private and even from state forests, do the cutting, sawing, and transporting themselves. Although as a rule they produce only enough to supply their own needs, some of their products are sold on the free market. State, republic, and local lumber enterprises have a completely planned program, whose fulfillment is under strict supervision.

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Forest Exploitation by Farmers

Direct forest exploitation by farmers has been steadily decreasing. From 1947 to 1949, farmers exploited forests as follows (in 1,000 cubic meters): 1947, 14,988, or 61 percent of the total timber cut; 1948, 12,650, or 49 percent of the total timber cut; 1949, 11,432, or 41 percent of the total timber cut.

The main characteristic of exploitation by farmers is waste, because there are still not enough roads, or adequate equipment. However, since cutting by farmers has been reduced to about half, compared with the prewar level, the extent of waste has been greatly reduced. The establishment of farm work co-operatives has made it possible to build roads, enabling co-operatives to exploit their forests efficiently.

The changed social structure with a consequent reduction in rural population of about one million persons has almost stopped unauthorized forest clearing and excessive pasturing in forests.

Forest Exploitation by State Enterprises

State enterprises have exploited forests as follows (in 1,000 cubic meters): 1947, 9,418, or 39 percent of the total timber cut; 1948, 13,384, or 51 percent of the total timber cut; 1949, 16,568, or 59 percent of the total timber cut.

State and republic enterprises continue exploitation previously done by large enterprises under long-term contracts and also exploit forests which had to be opened with a new network of railroads and roads, while local enterprises exploit other forests. However, since local enterprises are still not very well developed in many areas, exploitation is still done there by republic enterprises.

Production and Consumption of Wood

The annual forest accretion is 14,164,923 cubic meters, or 12 percent less than before the war. Wood consumption has not been reduced proportionally but should be increased considerably during the first period of development of the country.

Reconstruction of the country, establishment of new industries, construction of hydroelectric power plants and railroad lines, improvement of the standard of living, and construction of houses for workers has increased wood consumption considerably. Firewood consumption, however, has been reduced somewhat because coal is being used to a greater extent. Forest products have become more important for export because they are used to obtain foreign-exchange credits for industrialization.

The timber reserve, which is lower than normal, necessitates that cutting be less than the accretion, that is, below 14,164,932 cubic meters. Yugoslavia has actually cut (in 1,000 cubic meters): 18,700 in 1945, 21,320 in 1946, 24,406 in 1947, 26,044 in 1948, and 28,000 in 1949.

In 1949, the per-capita consumption of wood was 1.14 cubic meters, of which 0.54 cubic meter was technical wood, and 0.06 cubic meter firewood. Consumption by weight was 0.73 ton per capita, considerably more than the European average, which was 0.55 ton. Before the war, the ratio between technical wood and firewood consumption was 33: 67; it now is 48: 52.

Conifers are exploited by state enterprises to a larger extent than they should be, for they constitute only 32 percent of the forest area; 44 percent of the lumber cut in 1947 was conifer, 52 percent in 1948, and 42 percent in 1949. This disproportion is the result of the big demand for conifers for construction lumber and because of the demand for it on the world market. In 1949, this disproportion was beginning to improve in favor of deciduous lumber.

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The consumption of industrial wood (logs, cellulose wood, tannin wood, and other wood) was 40 percent in 1947, 45 percent in 1948, and 41 percent in 1949.

Logging Methods

Logging equipment and methods have changed greatly. Waste has been reduced because all species of trees are being more completely utilized than they were when many low-quality trees were left to rot.

Mechanization has been introduced in all phases of lumbering to eliminate hard physical labor and reduce production costs. Cutting and logging have been mechanized 7 percent with 1,146 chain saws and 50 mobile circular saws for cutting railroad ties. Hauling timber from the place of felling to the nearest shipping point has been mechanized 6 percent with 210 caterpillar tractors, 20 skids, and 40 mobile cableways. Loading has been mechanized 8 percent with 81 mobile motor cranes. Mobile ramps of domestic construction further facilitate operations. On the basis of machinery already procured, mechanization should be at least 50 percent higher, but it will take some time before new work techniques are mastered.

Transport is 85 percent mechanized. Rail and truck transport are utilized equally since 532 kilometers of highways for truck transport have been constructed.

Wood Processing

Sawmills have remained the most important processing facilities in the lumber industry. Their prewar capacity was quickly reached through renovation and reconstruction of almost all destroyed and damaged sawmills. Because of the need for speed in reconstruction, the reconstructed mills are not technically superior to the former ones except for having more solidly built buildings, and new modern horizontal frame saws, which have introduced partial mechanization. A completely mechanized sawmill was constructed in Donji Vakuf and another one is under construction in Limbus (Slovenia).

The largest increase in finished products has been in box manufacture (66,066 cubic meters in 1947 and 106,589 cubic meters in 1949, an increase of 161 percent); parquet (760,318 cubic meters in 1947 and 1,028,470 cubic meters in 1949, an increase of 133 percent), and casks (with a capacity of 322,279 hectoliters in 1947 and 413,599 hectoliters in 1949, an increase of 130 percent). Furniture manufacture has also increased but exact data cannot be given for lack of information on furniture produced by enterprises of local significance.

All plywood and veneer factories have been restored and prewar capacity reached. Since raw materials are available, these are to be expanded. A new factory under construction in Blazuj near Sarajevo will increase production capacity 30 percent.

The production of tanning extracts is up to prewar level, but cannot be increased because of lack of raw materials.

New finished products include fiber-board panels, for which the production capacity is one million square meters, and wooden houses of Swedish type, for which the production capacity is 1,000 houses a year. A large factory for manufacturing fiber-board panels is under construction in Bosnia-Herzegovina.

Although the production of finished products is increasing, it is not keeping pace with the general increase in industrial production and improvement in the standard of living. There is still a scarcity of packing material (crates, casks) and furniture. In 1948, finished products constituted 28 percent of the total production in the lumber industry, and only 28.3 percent in 1949.

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EXPORT

If the average amount and value of lumber exported annually from 1927 to 1939 is designated as 100, the average amount exported annually from 1947 - 1949 is 81, and the average value is 249. The increase in value is the result of the price increases on the world market which averaged 300 percent.

From 1947 to 1949, changes in the export structure were greater, with cheaper items such as raw materials and semifinished products prevailing.

The export structure from 1947 to 1949 is shown in the following table.

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<u>Product Exported</u>	<u>Unit of Measurement</u>	<u>Avg Quantity Exported</u>		<u>Avg Value of Lumber Exports</u>		<u>Avg Value by Unit</u>	
		<u>Quantity</u>	<u>Percent of Total Lumber Exported</u>	<u>Million Dinars</u>	<u>Percent of Total Value of Lumber Exported</u>	<u>Dinars</u>	
Firewood	1,000 cu m	593.6	25.8	168.4	6.1	284	
Cellulose beech	1,000 cu m	243.4	10.6	108.2	3.9	445	
Deciduous logs	1,000 cu m	35.5	2.8	92.6	3.4	2,608	
Deciduous hand-hewn wood	1,000 cu m	--	--	--	--	--	
Deciduous sawed lumber	1,000 cu m	198.8	12.1	302.4	29.1	4,036	
Railroad ties	1,000 ties	530.1	4.6	92.8	3.4	175	
Charcoal	1,000 tons	13.9	1.2	31.4	1.1	2,259	
Tanning extracts	1,000 tons	3.5	0.3	57.6	2.1	16,457	
Other deciduous products	1,000 tons	9.0	0.8	128.0	4.6	14,222	
Total of deciduous products	1,000 tons	669.1	58.2	1,481.4	53.7	2,214	

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Conifer logs	1,000 cu m	152.0	9.2	120.0	4.4	789
Cellulose conifers	1,000 cu m	188.2	8.8	171.0	6.2	909
Conifer hand-hewn wood	1,000 cu m	2.9	0.1	3.0	0.1	1,034
Conifer sawed lumber	1,000 cu m	543.7	23.6	979.0	35.5	1,801
Other conifer products	1,000 cu m	0.8	0.1	2.7	0.1	3,333
Total of conifer products	1,000 cu m	461.4	41.8	1,275.7	46.3	2,765

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From 1947 to 1949, the average price increase of wood products was as follows, if the average price for 1927 - 1939 is designated 100:

Firewood	277
Deciduous logs	372
Deciduous sawed lumber	539
Railroad ties	500
Charcoal	243
Tanning extracts	430
Conifer logs	577
Conifer hand-hewn wood	284
Conifer sawed lumber	429

In 1947, the export of forest and lumber industry products constituted 20.1 percent of Yugoslav exports, and 22.3 percent in 1948.

In the export of deciduous products, the most important was sawed lumber, which comprised almost 60 percent of the total of deciduous products exported. Ninety percent of the sawed lumber exported was oak and beech. Beech export has been increasing considerably from year to year, while oak export has remained more or less constant.

Conifer sawed lumber comprised 76 percent of the total of conifer products exported. The export of conifer products was 170 percent higher in quantity and 22 percent higher in value than the export of deciduous products. The export of conifer sawed lumber decreased 61 percent compared with prewar export.

From 1947 to 1949, the types of forest products exported to various countries were as follows:

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Firewood	277
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<u>Product Exported</u>	<u>Percent of Total Forest Products Exported</u>		<u>Importing Countries</u>	<u>Remarks</u>
	<u>By Quantity</u>	<u>By Value</u>		
Firewood	25.5	6.1	Hungary, Italy, Trieste and Switzerland.	Export was absolutely and relatively larger than before the war.
Cellulose beech	10.6	3.9	Italy, and Austria and Switzerland to some extent.	
Cellulose conifers	8.3	6.2	Austria, Netherlands, Switzerland and Italy. In 1947, Hungary and Poland.	
Deciduous logs (for veneer and sawing)	2.8	3.4	Italy, Hungary, Netherlands, Poland, Czechoslovakia, and Mediterranean countries, and small quantities to Austria, Belgium and Switzerland.	
Conifer logs (mine timbers, logs for sawing, poles)	9.2	4.4	Logs to Hungary. Mine timbers to Belgium, Great Britain, Hungary and Finland.	
Charcoal	1.2	1.1	Trieste, Italy, Austria, Switzerland and Hungary.	
Railroad ties	4.6	3.4	Italy, Hungary, Netherlands, Austria, Switzerland, Belgium, and Denmark.	
Hand-hewn wood	0.1	0.1	Trieste.	
Deciduous sawed lumber	12.1	29.1	Great Britain, Italy, Hungary, Netherlands, Mediterranean countries, (mostly Egypt, Israel, Greece, Turkey, and Algeria), Trieste, France and Argentina.	

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Tanning extracts	0.3	2.1	--	Export sharply decreased so that it is only one fourth of prewar export.
Various other products	0.9	4.7	Plywood to Egypt, Algeria, Netherlands, Great Britain, Italy and Trieste. Parquet to USSR, Netherlands, Italy and Great Britain. Veneer to Great Britain, Netherlands, Norway, and Italy. Crates to Israel, Netherlands and Great Britain.	

Export of Forest Products, 1947 - 1949

<u>Exports to</u>	<u>Percent of Total Forest Products Exported</u>	<u>Products Exported</u>	<u>Remarks</u>
Great Britain	27.5	Conifer and deciduous sawed lumber, mine timbers, veneer, and plywood.	
Italy	15.8	Firewood, cellulose beech, conifer and deciduous sawed lumber, railroad ties, charcoal, logs for sawing and veneer, and small quantity of cellulose conifers.	Export was almost completely stopped in 1949.
Hungary	11.2	Beech firewood, conifer logs, conifer sawed lumber, ties, and cellulose conifers.	Export was almost completely stopped in 1949.

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Netherlands	10.9	Deciduous and conifer sawed lumber, veneer, plywood, parquet, cellulose conifer, and ties.	
Mediterranean countries	6.0	Deciduous and conifer sawed lumber, plywood, parquet, crates, ties, and mine timbers.	Main exports were to Egypt, with smaller quantities to Israel, Turkey, Algeria and Malta.
USSR, Czechoslovakia, Poland	5.2	Deciduous sawed lumber, parquet, tanning extract, cellulose conifers, logs for veneer.	Export was almost completely stopped in 1949.
Austria	4.7	Cellulose conifers and some cellulose beech, ties, charcoal, and tanning extracts.	
Switzerland	3.6	Conifer sawed lumber and cellulose wood, ties, firewood, and charcoal.	
Trieste	2.5	Deciduous and conifer sawed lumber, firewood, charcoal, hand-hewn wood, and plywood.	
Sweden	1.1	Deciduous sawed lumber, some veneer, and logs for veneer.	
Belgium	1.0	Deciduous sawed lumber, ties, mine timbers, and logs for veneer.	
France	0.9	Deciduous and conifer sawed lumber.	
Other countries	9.6	Various products	To Argentina, conifer sawed lumber; Norway, deciduous sawed lumber, veneer, and parquet; and Denmark, ties.

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In 1948, 31 percent of wood products exported were exported by sea, and 51 percent in 1949. Whereas 725,000 tons of forest products were exported by sea in 1935, 476,000 tons were exported in 1948, and 732,000 tons in 1949.

In 1949, individual ports participated in forest-product export as follows: Rijeka, 57.5 percent; Bakar, 9.8 percent; Sibenik, 12 percent; Split, 1.4 percent; Ploce, 2.8 percent; and Dubrovnik, 16.5 percent, and other ports, 1.8 percent.

REFORESTING AND FOREST RECLAMATION

Reforestation of Karst and Bare Lands

Yugoslavia has 1,700,000 hectares of karst and bare land, 1,399,783 hectares of uncultivated forest land, and 1,478,370 hectares of brushwood. Consequently, the socialist planned economy has had to start action on a large scale to reforest old forest areas, restore karst and denuded land, and improve deteriorated forests and brushwood. This is being done by directing exploitation under state control of areas with reserves of less accessible and lower quality timber, thus saving forests along communication arteries, reforesting denuded forest areas, and reclaiming deteriorated forests.

The Five-Year Plan calls for reforesting 100,000 hectares of karst and denuded land, and other bare forest areas, and improving 150,000 hectares of brushwood and deteriorated forests.

From 1947 to 1949, the following results were achieved in reforestation and reclamation (in hectares):

	<u>1947</u>	<u>1948</u>	<u>1949</u>	<u>Total</u>	<u>Percent of Plan Achieved</u>
Reforestation	20,382	24,258	52,761	107,401	107
Reclamation	47,068	93,018	99,141	239,227	159
Total	67,450	127,276	151,902	346,628	138.6

Although quantitative results were achieved, qualitative results were not as satisfactory. Poor qualitative fulfillment has been due to inadequate scientific preparation. Although the Forestry Research Service is young and cannot yet show the paths to follow or propose the solutions for the renovation of Yugoslav forests, it has not helped inexperienced personnel in the field to master the biological problems of such renovation. For instance, no surveys, maps, or directives based upon general rules, conditions, and experience were made for selecting the kind of trees to be planted.

Reclamation has consisted mostly of a mere prohibition against pasturing in forests.

REGULATION OF TORRENTS

In 1949, the total area subject to flooding by torrents was about 200,000 hectares, with 1,769 listed torrents. Of the total number 357 were in Serbia, 297 in Croatia, 242 in Slovenia, 550 in Bosnia-Herzegovina, 252 in Macedonia, and 71 in Montenegro.

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Damages caused by Torrents

Damage caused by flooding varies and often is of catastrophic dimensions. Some examples are cited below.

Of the 11,482 kilometers of railroad lines in Yugoslavia, about 93 kilometers or 0.8 percent are endangered by flooding after every heavy rain. Such flooding interrupts railroad transportation an average of 4,694 hours annually or 48,943,339 ton-kilometers, and adds to expenses incurred in repairing railroad lines. Damage to highways is similar.

Regulation of Torrents

Although torrent regulation began in Istria, the Slovenian Primorje, and Dalmatia in 1883, in the Croatian Primorje in 1895, and in Serbia, Bosnia-Herzegovina, Macedonia, and Montenegro in 1938, the results achieved were far from satisfactory.

Failure can be attributed mainly to the resistance of the farmers, who increased their agricultural area at the expense of the forest and used huge forest areas or remnants of deteriorated forests for pasture. Efficient lasting regulation of torrents and torrent streams consists of reforestation or grass cultivation in the drainage area of torrents.

The plan includes the forestation of torrent areas. To date a considerable number of torrent areas have been reforested.

WOOD CONSUMPTION

Wood consumption has changed considerably since the liberation, with a considerable increase in technical timber consumption and a decrease in firewood consumption. The per-capita consumption of wood is 1.14 cubic meters, of which 0.54 cubic meter is technical timber, and 0.6 cubic meter is firewood; the consumption by weight is 0.73 ton, which is considerably above the European average of 0.55 ton.

About 50 percent of the entire consumption of the sawed soft wood is used for construction. The building trades consume long logs, hand-hewn wood, poles, ties, and the like. About 3 percent of the total production of sawed soft timber is used for cabinet-making. About 6 percent of the sawed soft lumber is used for boxes. This percentage is quite low compared with that of the industrially developed countries. England, for instance, consumes one third of its sawed lumber for packaging.

Most of the sawed hardwood lumber is exported. Domestic consumption is principally for the manufacture of furniture, casks, and wooden parts used in machine construction.

The consumption of plywood is far below production capacity. Veneer production is well developed quantitatively but not qualitatively.

Wood is utilized to a large extent in mining operations. A considerable quantity of wood is consumed for railroad ties. About 5 percent of the technical wood production in Yugoslavia consists of railroad ties.

The finest musical instruments are being produced of wood.

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Various plastic materials, the most important of which are fiber-board panels, are being produced to replace plywood panels and sawed lumber to a considerable extent.

Shipyards, factories, and producers of railroad cars and agricultural machines are large consumers of timber.

Today, 95 percent of the cellulose produced in Yugoslavia is being produced from wood. Wood consumption for cellulose production in Yugoslavia is 3.6 percent of the technical wood production.

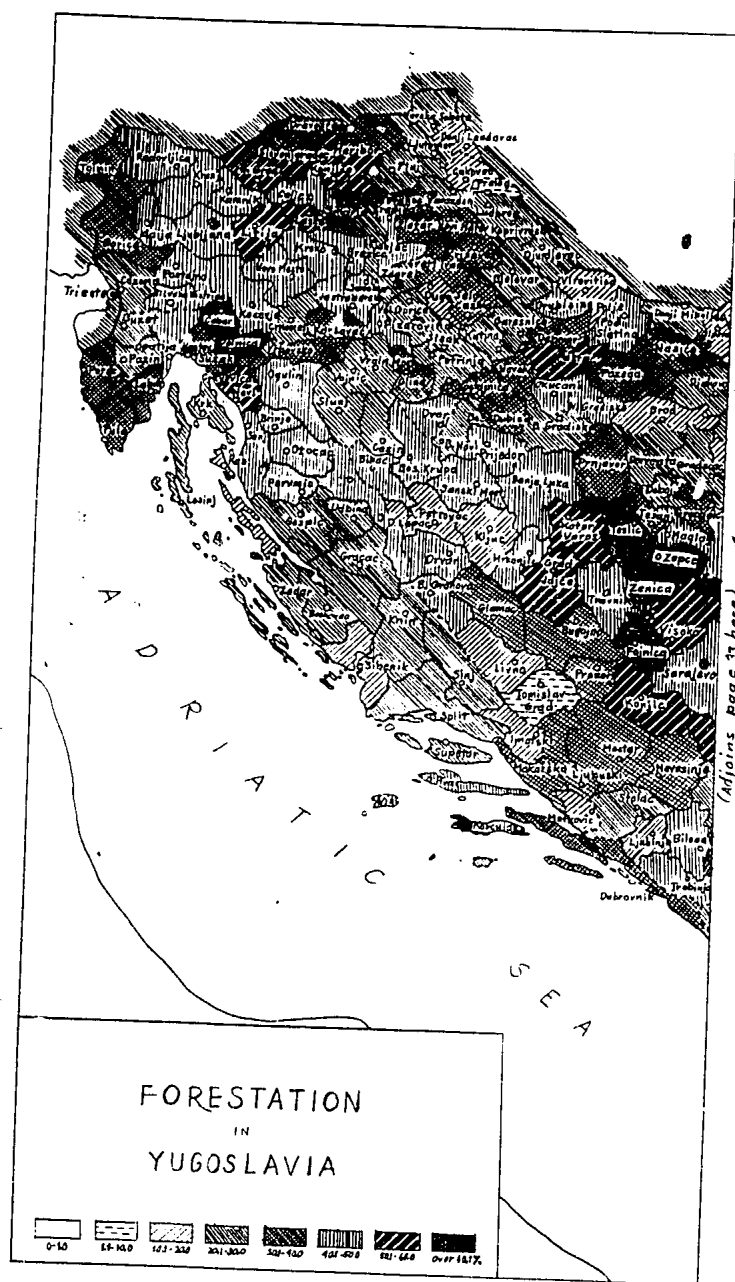
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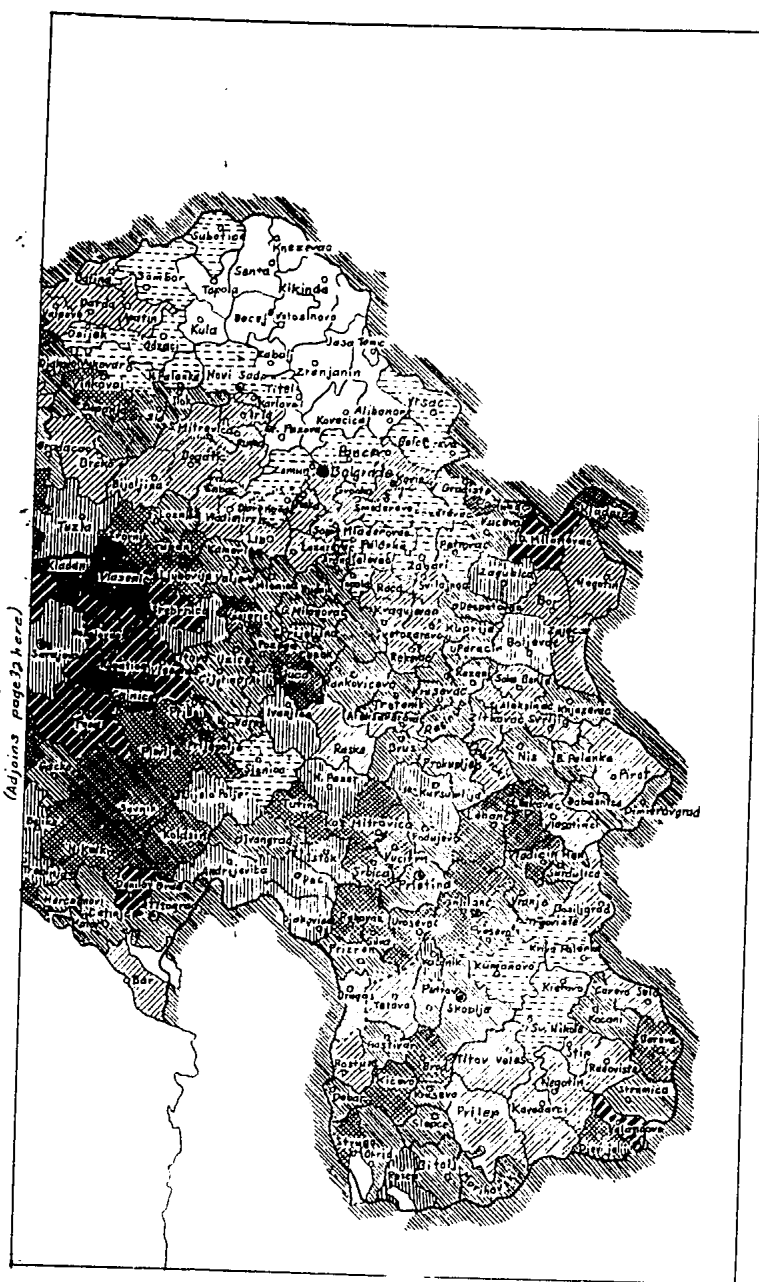


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